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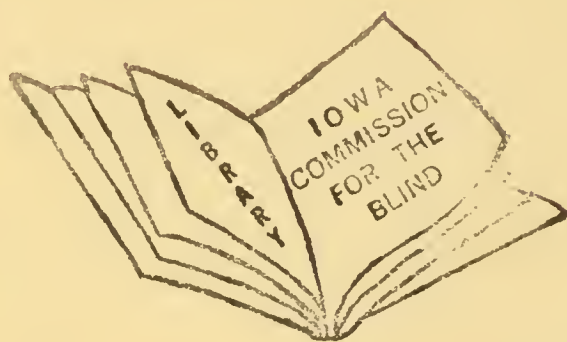
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VISION CARE FOR CHILDREN: NATIONAL
PROGRAMS AND LEGISLATIVE CONCERN

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January 24, 1974


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I. PREFACE

This paper has been prepared in response to Congressional interest in vision care services and the prevention of blindness. Concern has been manifested by the authorization of the National Eye Institute, the most recent institute of the National Institutes of Health, and by Congressional inquiries in the area of detection and prevention of visual disorders.

This report includes an indication of the incidence of visual defects among pre-school and school age children, the role of vision screening programs as a means of minimizing these defects, current programs established to detect visual problems before they develop and a summary of current proposed legislation intended to increase availability of vision care for children. A Glossary of technical terms is included in Section VI.

II. INTRODUCTION

The examination of young children for vision problems serves several functions: 1) to detect eye disorders such as amblyopia as early as possible, when still treatable, in order to prevent a more serious disorder such as blindness, 2) to recognize vision problems as they develop so that they may be corrected or minimized, and 3) to be aware of a visual handicap so that the adverse effects on the child's learning and adjustment are minimized.

A central factor contributing to the large number of undiagnosed vision problems in children, is that parents, even many doctors who are parents, are not aware of their children's eye problems because there is usually no pain associated with the problem and no evidence of the disorder except with crossed eyes, wandering eye or excessive blinking. The child himself does not mention the problem as he does not know that he could be seeing more or better.

Eye specialists believe that ideally, every child should have a complete professional eye examination in infancy and at regular intervals, preferably yearly, throughout childhood. However, due to cost and manpower needs, it does not appear that this is feasible and until it is, vision screening programs for preschool and school age children, conducted by well-trained non-professional personnel, are one method by which children with vision problems can be identified and referred to eye specialists. In addition, a widespread well-organized educational campaign to publicize the need for early and regular eye care is important.

The Nation currently has substantial but improvable programs to provide vision services to children. State programs for screening public school children, as well as a few State, community, and Medicaid programs to provide preschool eye care are functioning; but these programs vary greatly as to the extent to which they provide care. The great majority of American children have not had their vision checked until six years or older. Many disorders, if detected before this age, can be treated and severe visual problems such as one-eye blindness, prevented.

III. DIMENSIONS OF VISUAL PROBLEMS

A. Prevalence of Visual Defects Among Children

Unfortunately very little data are available on the incidence of vision problems in children. This is partially true because problems have not been detected due to lack of an eye examination and because results of screening programs that have been conducted have not been made available and follow-up on referrals for professional care was not secured. In addition, screened populations are not always indicative of the general incidence of the disease due to misleading statistics from exclusion of cases who previously had eye care for any defect or from attracting a population with higher risk to the screening. An example of the latter is when a screening program attracts children who, due to an abnormal result on a home screening test, are more likely to participate in another screening program.

Included below are excerpts from a chapter on "Prevalence and Types of Vision Problems" by Jane S. Lin-Fu. 1/ This article states the problem of compiling statistics on the incidence of vision problems in children, and also provides data on the reported prevalence of visual problems among children screened in several programs:*

A Survey by Crane et al. in St. Louis⁹ found that 27 percent of the school children had eye problems which required treatment or observation. On the basis of this study, the Children's Bureau estimated that, in 1960, 10,200,000 children between 5-17 years of age had eye conditions requiring special care. The number projected for 1970 is 12,500,000.⁴⁸

The prevalence of visual problems among preschool children is more difficult to determine, for there has been no entirely satisfactory means of screening children in this age group, and what constitutes normal vision in the preschool years has remained to some extent a controversial subject. The rate of referrals from various screening programs among preschool children ranges from 1 to 30 percent.^{24 34}

Of the 156,252 preschool children who were screened during July 1965-June 1966 in projects reported to the National Society for the Prevention of Blindness, more than 8,700, or about 5.5 percent, were referred for

1/ Lin-Fu, Jane S. Vision Screening of Children. Washington, DHEW, 1971. 24 p. (PHS Publication No. 2042): 3-4.

* The footnoted references in this excerpt may be found in Appendix A of this paper (page 23).

professional eye care. Analysis of the results of professional examinations of the children referred from 109 projects revealed that 75 percent of those examined were in need of eye care, giving a defect rate of 29 per 1,000 screened. Of the children for whom a specific abnormal condition was reported, refractive errors were diagnosed in 87 percent, muscle imbalance in 22 percent, and amblyopia in 11 percent. Since these findings are based on incomplete reporting of results, they probably underestimate the proportion of preschool children with visual problems. The rapidly expanding vision screening programs for preschool children should result in better knowledge about vision in this age group.

Visual problems are more prevalent among older children than among younger children. In the St. Louis study, 31 percent of the sixth grade students required eye care or observation, while only 23 percent of the first grade students needed such attention. In the Orinda (Calif.) study visual problems were found in 18 percent of the children between five and seven years of age and in 31 percent of the 13-15-year-old-group.²⁷ Partially seeing children, defined as those with a visual acuity of 20/70 or less in the better eye after the best correction possible, are estimated to number one in 500 in both the preschool and school-age groups. Children who are legally blind (defined as visual acuity of 20/200 or less in the better eye after correction, or acuity better than 20/200 but visual field in the better eye restricted to less than 20 degrees in the widest diameter) number about one in 8,000 in the preschool and one in 1,400 in the school-age group.³

The two major correctable visual defects among preschool and school age children in the United States are refractive errors and muscle imbalance, both of which are considered causative factors of amblyopia.^{9 14} In the St. Louis study, refractive errors were found in 20.5 percent of the children examined (hypermetropia, hypermetropic astigmatism or both in 12.3 percent, and myopia or myopic astigmatism or both in 8.2 percent), and muscle imbalance in 4.4 percent.⁹

Defective color vision, which is hereditary in most cases, occurs with much greater frequency among boys than girls in the general population. The reported prevalence varies considerably among the surveys. According to "Services for Children with Eye Problems" published by the American Public Health Association,³ about eight percent of boys and one-half of one percent of girls in the average school population have evidence of defective color vision. Higher and lower figures have been quoted by other sources. Color blindness varies with race; for example, red-and-green blindness is reported by Pickford to be more frequent among whites than among Negroes.²⁸

It should be noted that the predicted incidence for 1970 may be based on a population estimate that did not anticipate the lowered birth rate. The article estimates that there were about 44 million children five to 17 years old in 1960 and predicts an increase in this number to 54 million in 1970. The Population Division of the

Department of Commerce reported that the 1970 census figures indicated that the population age five to 17 was 53,489,744.

Some additional statistics on the prevalence of amblyopia were compiled by Dr. Lippmann in his article "Vision Screening of Young Children". He cautions laypersons, as well as experts in the area of vision, against careless use of statistics. He has found that the incidence of remediable amblyopia has been reported as follows:

Flom, 2/ 1966: 0.4 percent of newly discovered amblyopia among children; "Moran, 3/ Louisville 1958: 0.33 percent of all screened; Kittredge and Cunningham, 4/ New York State 1965: 0.2 percent among 970 screened children. The statistics of the National Society for the Prevention of Blindness (Hatfield) 5/ show: 28,665 pre-school children screened: 1,259 (4.4%) among those were referred. 863 (68.5% of the referred) had professional examinations. Three percent of the examined children or 0.1 percent of all screened preschool children had amblyopia. Hatfield's tabulation of 1967 6/ reported an incidence of 2.5 amplyopia among 1,000 screened children (.25%)."

B. Visual Problems in Particular Groups of Children

Some studies suggest that visual problems occur more frequently among specific groups of children. In one study of the 102 mentally retarded children who were given a complete eye examination, 76 had abnormal findings. 7/ In addition, in a

2/ Flom, Merton C., and Neumeier, Richard W. Prevalence of Amblyopia. Publ. Health Rept. 81, April 1966: 329-341.

3/ Moran, C.T. Preschool Vision Screening in Louisville. Sight-Saving Review, v. 28, 1958: 92-95.

4/ Kittredge, E. and F. Cunningham. Prekindergarten Vision Screening in Yonkers Public School. Journal of School Health, v. 35, June 1965: 278-280.

5/ Hatfield, Elizabeth MacFarlane. A Year's Record of Preschool Vision Screening. Sight-Saving Review, v. 36, Spring 1966: 18-22.

6/ _____. Progress in Preschool Vision Screening. Sight-Saving Review, v. 37, Winter 1967: 194-201.

7/ Fletcher, M.C. and M.M. Thompson. Eye abnormalities in the mentally defective. American Journal of Mental Deficiency, v. 66, Sept. 1961: 242-244.

vision screening program conducted by the Michigan Health Department, the rate of referral among a group of mentally retarded children was three times that found among regular classroom children. 8/ Another study states that among a group of 103 children with impaired hearing, 58 percent had some visual abnormality. 9/ Visual defects are also reported to be more frequent among children with cerebral palsy. Sixty eight percent of a group of 98 four to ten year old children with cerebral palsy were found to have either an ocular defect or a refractive error, or both. 10/ It is difficult to determine if the higher rate of visual problems among these groups derives from their difficulty in comprehending the test and following the instructions. Similarly, it has not been established whether this problem of test comprehension may be a causative factor among children from low socioeconomic areas who are reported by several studies to have a higher incidence of visual defects than children from higher socioeconomic areas. In one study, blindness and visual impairment were said to account for 12.4 percent of chronic conditions in the group with an annual income below \$2000 and only 6.4 percent among those whose income was \$7000 or more. 11/ Furthermore, the results of a Michigan preschool hearing and vision screening program show that more than twice as many vision defects were found in children from low socioeconomic areas than those from higher income families. 12/ However, a recently

8/ Michigan Department of Public Health. Vision and hearing screening in selected classes for the mentally retarded, City of Detroit, Michigan. Washington, D.C. DHEW. Social and Rehabilitation Service. Children's Bureau, 1966.

9/ Suchman, R.G. Visual impairment among deaf children. American Journal of Ophthalmology, v. 77, Jan. 1967: 18-21.

10/ Schachat, W.S. and others. Ophthalmologic findings in children with cerebral palsy. Pediatrics, v. 19, April 1957: 623-628.

11/ Oberman, J. William. Vision Needs of America's Children. Sight-Saving Review, v. 36, Winter 1966: 217.

12/ Lippmann, Otto. Vision Screening of Young Children. American Journal of Public Health, v. 61, Aug. 1971: 1586.

published report containing findings as estimated from the Health Examination Survey of 1963-65 regarding uncorrected binocular visual acuity of six to eleven year old children, indicated that the proportion of children with defective distance acuity increased as the parent's educational level or family income level increased. 13/

The variance among these findings acts as a caution that the reported high incidence of visual defects among some low income persons should not be taken as proof that cultural deprivation leads to actual visual impairment. Some vision problems, for example, are due to vitamin A deficiency (Xerophthalmia), but this condition is not prevalent in the United States. However, children in the lower socioeconomic population with preventable or treatable eye defects do not always receive medical care. Availability of care and recognition of need of medical attention, particularly preventive care, due to attitudes of the parents and their freedom to take time to obtain medical care, are probably greater with persons of higher socioeconomic levels.

13/ Binocular Visual Acuity of Children: Demographic and Socioeconomic Characteristics United States. DHEW. Vital and Health Statistics, Series 11, No. 112, DHEW Publication No. (HSM) 72-1031. 1972: 10-11.

IV. VISION SCREENING

A. Function

Although the statistics available cannot be considered as absolutely representative of the problem, they do manifest the presence of visual problems among children. The fact that many of these disorders, if detected in time, can be corrected and, thereby, more serious untreatable conditions prevented from developing argues the need for children to have vision examinations. Most American children have not had their vision checked by the time they enter school. ^{14/} Vision screening programs provide a means of obtaining eye care for children who otherwise would not be checked. Vision screening is a procedure by which large numbers of children can be scanned for visual defects through the use of various established testing methods. Schools provide a natural locale for screening children six years and older. Preschool age children present certain problems in screening that older children do not. Experience indicates that a successful screening program for preschoolers requires public education and wide and persistent announcing of the availability of the service combined with community support and alert testing personnel. The examiners must be prepared for young children to have limited attention spans, easy distractibility and variance from child to child in the ability to perform skills such as recognizing forms or shapes which some tests require. Young children can be examined in community centers such as schools or churches, in mobile units, or at home by a parent. Screening programs are not intended to be diagnostic, but to sort out the children who may have eye problems. Children who appear to have a visual problem are then referred to an eye specialist for a professional decision as to whether there is a problem and how it will be treated. Some children who are referred will be found upon closer examination to have no problem. Visual defects among some children will not be detected by screening

^{14/} Doster, M.E. Vision screening in schools--why, what, how and when? Clinical Pediatrics, v. 10, Nov. 1971: 662-665.

methods. However, in general, vision screening programs provide a means for an eye examination early in life for many children.

A representative for the National Society for the Prevention of Blindness stated that the Society believes that there is a definite need for screening children for vision problems, especially children age three to six. From the standpoint of prevention of blindness, this is the most important age group. If amblyopia, sometimes referred to as lazyeye, is detected and treated during these early years, the chances of correction of that disorder are very good. Above age six, chances are not good. Amblyopia is ranked by some eye specialists as second to none as a preventable cause of blindness in at least one eye. Dr. Otto Lippmann considers early detection and correction of ocular defects "as important a part of medical care as immunizations." ^{15/} Although not as critical in the prevention of blindness, vision screening of school age children is important to identify the visual handicaps with which the child enters school and to detect vision problems as they develop. The detection of visual defects should result in their treatment and minimization to provide maximum vision and to avert problems in learning and in play with other children that may result from visual limitation. Often, if the child is unaware of the cause of the problems, he will interpret them as his being generally inferior to his classmates and friends. Examination of school age children can be divided into initial screening for conditions such as color blindness and muscle imbalance, which will not develop at a later age, and subsequent less comprehensive screening to detect problems such as myopia that develop as the child matures. Children who have previously received eye care can also benefit from screening programs. Examination of a child who wears glasses can result in the detection of need for different glasses, check for broken or bent glasses, and determination that glasses are being used.

^{15/} Lippmann, Otto. Vision screening of young children. American Journal of Public Health, v. 61, Aug. 1971: 1586-1601. (and a letter to the editor in response by Box, R.A. Vision screening of young children. AJPH, June 1972).

Well designed screening programs, in addition to identifying and referring children who need special eye care, provide information on how many children are receiving private eye examinations and on the incidence of visual defects. A good screening program should include 1) the examination of the child, 2) referral, if necessary, to any eye doctor, and 3) a follow-up procedure to determine if the suspected visual problem was verified and what treatment was provided. The follow-up procedure also provides a means of evaluation as to the efficiency of the screening procedure.

Screening programs, of course, require manpower. But initial programs, such as those conducted in Michigan have shown that volunteers can be trained to perform much of the screening. Screening programs should ideally refer only children who need professional care to doctors, in order to minimize the expense to the parents and to minimize the increased demands that programs would present to eye specialists. Error, however, should be made on the side of over referral.

B. Existing Vision Care Programs for Children

1. Programs for Preschool Age Children

a. Medicaid

Under Title 19 of the Social Security Act there is a requirement that States set up dental and vision screening programs for medicaid clients aged 0 to 21. Due to the extent of the proposal, the government suggested initial programs be limited to the age group 0 to 6 years. Effective July 1, 1973; however, programs are to be available to the 0-21 year old population. The States are said to be progressing at various speeds and using various mechanisms of implementation of the program. 16/

b. Community Preschool Programs

Many communities throughout the country have screening programs. The National Society for the Prevention of Blindness has provided a compilation of preschool programs.

16/ Personal communication with a spokesman at the Social Security Administration.

(Appendix B: NSPB and Independent Projects) and those of the Headstart program (Appendix C) for the 1970-71 screening year (the 1971-72 results are presently being compiled). The 1970-71 results show that a little over two percent of all children screened between three to six years old needed some further attention as verified by a follow-up on the eye examination. There is a slightly higher incidence of need for referral in the findings of the Headstart projects, a program generally populated by children of low income families.

c. State Requirements for Preschool Visual Examination

At present, only four States have requirements for preschool visual examination. They are as follows:

(1) Michigan passed a law in July 1968 that requires that every child entering school must have had an eye examination by an eye specialist or have been screened by a health department certified vision technician. This bill was proposed by eye specialists due to the large number of school age patients that they were seeing with one-eye blindness that possibly could have been prevented if diagnosed at a younger age.

(2) Georgia passed a law effective September 1, 1973 that all children entering grade one, must have had a vision test.

(3) Illinois has passed a law containing ambiguous language that officials define as meaning either that a child must have had an eye test before entering first grade or that he must be tested as soon as he enters grade school.

(4) The Commonwealth of Virginia requires that each child have a complete physical examination for entry into first grade. The examination must meet specific vision testing requirements as set up by the Board of Health.

Of course these laws present a manpower problem which States must anticipate when the laws are passed. Michigan was in a good position to implement their law as they had Public Health nurses and trained volunteers who had taken a course for qualification as vision testers to supplement vision specialists.

d. Home Testing

Because of the difficulty of reaching all children, especially those of preschool age, vision screening tests that can be administered at home by a parent have been designed. One such test was developed by the National Society for the Prevention of Blindness and is available at no cost upon request. The Society requests that a report card be completed and returned to them when the kit is used. Three hundred fifty thousand kits were requested and distributed in the first four months of the year. Only about one percent of the cards were returned and the Society then followed-up with the doctors who performed an eye examination. Of this small group who completed all aspects of the home testing program, there was a high rate of confirmation from the doctors that the children did need treatment. The kit has been advertised in popular magazines such as Readers' Digest and Time, on the Today Show, youth TV shows, educational television and in pediatric journals. The Society has been impressed by the number of pediatrician that have ordered kits for patient use. The Society stresses that persons such as pediatrician who see children long before they enter school, should be aware of the need for vision testing.

2. Programs for School Age Children

In addition to the Medicaid Program previously discussed which provides vision care to medicaid clients age 0 to 21, all States have some sort of a vision screening program for school age children. However, the programs vary in their thoroughness and frequency of examinations from State to State. The National Society for the Prevention of Blindness conducted a survey in the fall of 1967 to obtain information on the screening programs of the fifty States, District of Columbia, New York City, the Commonwealth of Puerto Rico, the territories of the Canal Zone, Guam, the Marianas, Samoa, and the Virgin Islands. The results of the survey manifest the variance in coverage of the different programs. Twenty-five states (45 percent) reported that screening programs are conducted in all of the school districts, 21 states (38 percent) reported that they have programs in over three fourths of their school districts, but not in all of them,

and five localities did not specify the proportion of the school districts covered by their screening programs. 17/ The summary of the report of this survey is included as Appendix D.

C. Legislation in the 93rd Congress Concerning Vision Care for Children

Legislative concern about vision services for children is generally a part of a large health delivery bill. National health insurance legislation generally includes provisions for vision care (eye examination and possible eye glasses). In addition, vision care and preventive health measures such as eye examinations for children are included in current legislation which provide Federal support for the development of Health Maintenance Organizations. Visual provisions of several of the bills which are anticipated to be focal points in Congressional consideration of these areas are summarized below. (The national insurance bills have been referred to the House Ways and Means Committee and the Senate Finance Committee.)

H.R. 1 The National Health Care Services Reorganization and
Financing Act of 1973, Mr. Ullman, January 3, 1973

This bill would establish a new program of health care delivery and comprehensive health care benefits in accordance with income for all residents of the United States. The benefits would be phased in over a time period and would include vision services for children under the age of 12. Coverage would include one free annual eye examination and limited eyeglasses coverage.

H.R. 22/S. 3 The Health Security Act of 1973, Mr. Kennedy/Mrs. Griffiths,
January 4, 1973

The purpose of this legislation is to establish a national health insurance program. The benefits are comprehensive. There would be no payment required of the patient for physician and optometrists' services and eyeglasses.

17/ Hatfield, E.M. and R.J. Nudell. State School Vision Screening Programs. The Sight Saving Review, v. 38, Fall 1968: 141.

H.R. 5200/S. 1100

National Health Care Act of 1973, Mr. Burleson/Mr. McIntyre

The purpose of this bill is to amend the Internal Revenue Code of 1954 and the Social Security Act to provide a comprehensive program of health care. Services and articles covered would include eye refractions by a licensed physician or optometrist and prescribed eyeglasses once a year for individuals under the age of 19 needing them and once every three years for persons over the age of 19.

S. 915

The National Health Insurance and Health Services Improvement Act of 1973, Mr. Javits, February 20, 1973

This bill proposes to gradually extend the Medicare program to establish a national health insurance program. Coverage for an annual physical checkup includes an eye examination for the purpose of prescribing, fitting or changing eyeglasses. An Amendment introduced on May 9, 1973 includes a provision for vision care (except eyeglasses which would be optional) by a physician or an optometrist.

P.L. 93-222
(H.R. 7974/S.14)

Health Maintenance Organization Act of 1973, Mr. Roy,
May 21, 1973 (referred to Interstate and Foreign Commerce
Committee) Signed into law on December 29, 1973

The purpose of this legislation is to provide basic and supplemental health services through the development of HMO's. Basic health services concerning vision care would be covered under provisions for physician services, preventive health services including children's eye examination conducted to determine the need for vision correction and other vision care.

V. CONCLUDING REMARKS

As with all screening programs, each program must be carefully planned as to how it will be conducted, and how individuals will respond to the findings of their examination. Vision screening does not present many of the problems associated with some other screening programs. Many visual defects, when detected, are curable or can be compensated for by glasses, surgery, patching, or a combination of procedures including exercise. Visual defects do not carry the bad or embarrassing connotations of many disorders. About fifty percent of the population of the United States uses corrective lenses. Recently, innovative ideas such as contact lenses and high fashion eyeglasses present the option of having visual correction "invisible" or a fashion accessory.

Generally, eye examinations are not obtained because of unavailability or ignorance of need. Even with vision screening programs some children will have undetected visual problems. However, such programs provide a workable means of detecting many of the potentially blinding defects in the fifteen million children between the ages of three and six years in the United States, as well as grade school children. Either independent screening programs or an eye examination available as a part of a comprehensive health program will provide this service. Periodic eye examinations available through a one-stop health service program may provide the ease of obtainment which has made school vision screening programs more easily implemented and used than preschool screening services.

Screening programs involving other organs or diseases often require that medically trained personnel such as physicians or dentists examine and test the entire population at risk in order to find a relatively few individuals who require treatment. However, many common defects and diseases of the eye can be readily detected by specially trained volunteers or health personnel. Thereby, the time of a more highly trained eye specialist can be spent in treating those individuals found to have a visual disorder.

VI. GLOSSARY OF TERMS

Provided below is a general definition of terms quoted from the indicated source. The exact specification of these terms may vary in particular studies. A short discussion prepared by the Joint Study Committee of the American School Health Association and the National Society for the Prevention of Blindness, Inc. is included for some of the eye problems most commonly found in screening programs. The preferred test used to detect one of these disorders varies with tester and, therefore, will not usually be included in this list.

Acuity, visual

Acuteness or clearness. 18/ It is expressed by a fraction in which the numerator is the number of feet at which the patient saw a line of type on a chart, and the denominator is the distance in feet at which the normal eye would see the smallest letters which the patient was able to see at the established distance; 20/50 vision refers to the fact that at 20 feet one can only see letters which the normal eye would see at 50 feet.

Amblyopia

Dimness of vision without detectable organic lesion of the eye. 19/

Amblyopia, included here as a special problem, is any reduction in visual acuity in one or both eyes, not correctable by refractive means and not attributable to obvious structural or pathological ocular anomalies.

Peripheral vision is present at birth or develops shortly thereafter. It is especially sensitive to any movement occurring in the field of vision. Infants follow lights and moving objects long before they can observe the details of their surroundings. Central vision is learned by practice in concentrating on the finer features of familiar shapes and outlines. This learning process automatically takes place in both eyes, however, if something upsets the delicate balance and coordination

18/ Dorland's Illustrated Medical Dictionary. 24th Edition, Philadelphia, W.B. Saunders Company, 1965: 33.

19/ Ibid., 64.

of the two eyes, there is a danger that only one eye will be used for seeing. The central image seen by the eye not used is shut out rather than experience the discomfort of double vision. The most common cause of the condition is faulty alignment of the eyes, i.e., one eye is turned inward or outward with respect to the other. If the eyes are looking in two different directions the child sees double. He escapes this annoyance by mentally shutting out the image of one eye. This condition is known as amblyopia or lazy eye, a tragic and unnecessary loss of vision among young children.

Amblyopia in a young child may not present a permanent reduction in vision since correction may be possible. Treatment may consist of glasses, patching, surgery, or a combination of procedures including eye exercises (orthoptics and pleoptics).

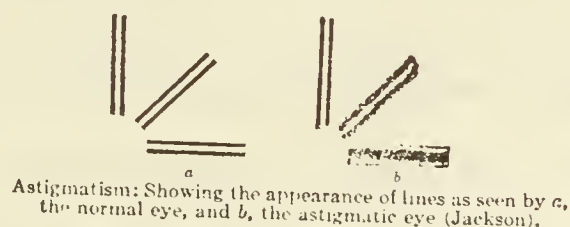
The goal of preschool vision screening programs is prevention of serious vision impairments through early detection and treatment of eye problems. The earlier that amblyopia is treated, the more successful will be the achievement of this goal. If the conditions which may lead to amblyopia are not identified and treated early, than a permanent reduction of vision may result. 20 /

Anisometropia

A difference in the refractive power of the two eyes which can be corrected by ordinary lenses. 21 /

Astigmatism

Defective curvature of the refractive surfaces of the eye as a result of which a ray of light is not sharply focused on the retina but is spread over a more or less diffuse area. This results from the radius of curvature in one plane being longer or shorter than that of the radius at right angles to it. (Airy, 1827). 22 /



Astigmatism: Showing the appearance of lines as seen by *a*, the normal eye, and *b*, the astigmatic eye (Jackson).

20 / Joint Study Committee of the American School Health Association and the National Society for the Prevention of Blindness, Inc. Teaching About Vision. New York, National Society for the Prevention of Blindness, 1972: 12-13.

21 / Dorland's Medical Dictionary, 1965: 96.

22 / Ibid., p. 155.

Astigmatism, is the irregular or defective curvature of the refractive surfaces of the eye (cornea, lens) resulting in a diffusion of light rays on the retina preventing sharp focus. It affects the vision at all distances.

If the astigmatic person looks at a figure consisting of straight lines radiating out from a center, he may see clearly only the lines pointing in one direction while the lines radiating out in another direction are blurred. Eye specialists find that almost everyone has astigmatism to some degree, but most of it is too slight to be noticeable. When it becomes pronounced, however, it affects the vision and may produce physical discomfort. The astigmatic person may also twist his body in order to get the normal areas of his corneas in position to see properly. He may frown when he reads or squint to constrict his pupils so that only one ray of light comes in instead of several conflicting ones: i.e., some from the properly curved portion of the cornea and some from the faulty curvatures.

Probably the worst hazard especially in the young, is that the astigmatic person may develop an aversion to reading which would affect his learning habits.

Most causes of astigmatism can be corrected with glasses, although the problem may be unusual enough to require contact lenses. Few cases are so severe that they cannot be corrected. It is important to get this condition corrected before the ages of six to eight, so that the child develops the best vision possible. If uncorrected, the child may develop bilateral amblyopia. 23/

Blindness

Generally defined in the United States as visual acuity for distant vision of 20/200 or less in the better eye, with best correction; or visual acuity of more than 20/200 if the widest diameter of field of vision subtends an angle no greater than 20 degrees. (Some states include up to 30 degrees).

Total blindness. Unable to distinguish light from darkness or with no light perception.

The partially seeing are defined as persons with a visual acuity greater than 20/200 but not greater than 20/70 in the better eye after correction.

This is an important group of visually handicapped persons who are not legally blind. It may also include those with less marked defects whose vision is expected to grow progressively. 24/

23/ Teaching About Vision, 1972: 15.

24/ Estimated Statistics on Blindness and Vision Problems. New York, The National Society for the Prevention of Blindness, 1966: 10-11.

Dyslexia

Inability to read or understand printed symbols which may be caused by many factors. 25/

Hyperopia

That error of refraction in which rays of light entering the eye parallel to the optic axis are brought to a focus behind the retina, as a result of the eyeball being too short from front to back. Farsightedness. 26/

Hyperopia, or farsightedness, can appear at any age. It is much more common than myopia, and its causes are almost the opposite. In this condition, either the eyeball is too short, and the focus falls behind the retina, or the lens is too thin and flat and does not bend the rays enough so the focus falls in front of the retina.

The result is that the hyperope can see better from a distance than he can from close up. If the person is young, and his eyes otherwise healthy, their normal adaptive powers can help him see clearly even at close distance without glasses. His short eyeball has been compared to a piano player with short fingers. He can play all the notes, but his fingers get tired sooner than a pianist with long fingers that glide effortlessly over the keys. The constant and forced adapting can tire the eye muscles and cause uncomfortable headaches, especially after close work.

One form of strabismus is also associated with farsightedness. If the hyperopia is severe enough, a young child may cross his eyes in an effort to adapt them for clear vision, thus, sometimes resulting in crossed eyes.

The treatment for farsightedness is eyeglasses for close work, so-called reading glasses, that the person can use to relieve the effort involved in adaptation; milder hyperopes often do not need their glasses when engaged in activities requiring longer range of vision such as driving or watching a movie.

If hyperopia appears early, a parent may notice that the child has difficulty reading, or frowns, or squints, or rubs his eyes. If it appears later, the hyperopic adult will notice it himself when his vision blurs for close work, or when, after periods of long use, he gets headaches. 27/

25/ Teaching About Vision, 1972: 64.

26/ Dorland's Medical Dictionary, 1965: 705.

27/ Teaching About Vision, 1972: 14-15.

Myopia

That error of refraction in which rays of light entering the eye parallel to the optic axis are brought to a focus in front of the retina, as a result of the eyeball being too long from front to back. Nearsightedness. 28/

Myopia, or nearsightedness, is usually first seen in children of around six to eight years of age. In these cases, the light rays are bent and focused in front of the retina, either because the eyeball is too long or the lens is too thick and curved so that it bends the rays too much.

As a result, the myopic child can see objects at near distances clearly, but cannot focus on objects at far distances. The hazard is that, especially in childhood, he might assume that his vision is normal. He can see clearly everything immediately around him, playmates and playthings, and consequently pays no attention to distant objects. If not corrected, it may affect him psychologically. In school, if he cannot see the blackboard and therefore misses lessons, he may assume that he is not as bright as the other students. In play periods, if he misses a long fly ball because he cannot see the batter he might assume he is not as good a ball player as the others. Some undetected myopes, as a result, tend to develop withdrawn personalities.

Myopia can definitely affect a person's physical stature. Because he can see best at near distances, the myopic person is inclined to bend over his work. Especially persons who do a great deal of reading, may become stoop-shouldered from a long habit of bending. Some myopes tend to squint. By squeezing the eyelids together, they create a "pinhole effect", eliminating peripheral vision and concentrating on central vision through one small opening. The tendency to squint can become a permanent disfiguring habit.

The treatment for myopia is wearing eyeglasses, prescribed so that they help the cornea and lens aim the light rays to their proper position on the retina. During adolescence when the body is growing and changing constantly, myopia may develop and cause postural problems. The eyes should be examined periodically. After the age of 20, eye examination may occur less frequently until around age 35, when the start of presbyopia is often seen. Except for the squinting, the myope experiences no discomfort with or without glasses. With glasses, the myope's eyesight can be as sharp as those without refractive errors. 29/

Refractive Error

A defect in the eye's ability to bring light rays to focus on the retina. 30/

There are four basic categories: myopia, hyperopia, astigmatism and preslyopia.

28/ Dorland's Medical Dictionary, 1965: 976.

29/ Teaching About Vision, 1972: 13-14.

30/ Ibid., p. 66.

Strabismus

Deviation of the eye which the patient cannot overcome. The visual axes assume a position relative to each other different from that required by the physiological conditions (Parsons). The various forms of strabismus are spoken of as tropias, their direction being indicated by the appropriate prefix, as esotropia, exotropia, etc. Called also manifest deviation and squint. 31

Appendix A: References from excerpt from "Prevalence and Types of Vision Problems"

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Appendix B: TOTAL: NSPB & INDEPENDENT PROJECTS

1970-1971 PRESCHOOL VISION SCREENING PROGRAM SUMMARY

I. SCREENING RESULTS, ALL PROJECTS

Total No. of Projects 1,041Volunteers: No. 27,129 Hours 172,206Reports: Complete* 881 Incomplete 160Hours per volunteer 6.3

| | Total All Ages | Total 3-6 | Sex | | Age | | | |
|---------------|-------------------|--------------|---------|---------|--------|---------|---------|--------|
| | | | Boys | Girls | 3 | 4 | 5 | 6 |
| Screened | | | | | | | | |
| No. | 352,645 | 331,640 | 160,943 | 151,593 | 30,066 | 124,422 | 135,487 | 36,553 |
| Percent | XX | 100.0 | 48.5 | 45.7 | 9.1 | 37.5 | 40.9 | 11.0 |
| Referred | | | | | | | | |
| No. | 17,000 | 15,310 | 7,304 | 6,966 | 1,043 | 6,526 | 6,050 | 1,489 |
| Percent | XX | 100.0 | 47.7 | 45.5 | 6.8 | 42.6 | 39.5 | 9.7 |
| % of Screened | 4.8 | 4.6 | 4.5 | 4.6 | 3.5 | 5.2 | 4.5 | 4.1 |

Breakdown by age and/or sex does not equal total due to incomplete reporting.

II. RESULTS FOR PROJECTS WITH COMPLETE*
REPORTSNo. of projects 881No. Screened, ages 3-6 298,906No. Referred, ages 3-6 13,797% of Screened 4.6No. Examined 8,781% of Referrals 63.6Number Positive 6,839% of Screened 2.3

Findings of Eye Examinations

| | No. | % |
|-----------------------|-------|-------|
| Total Examined | 8,781 | 100.0 |
| Negative (normal) | 1,649 | 18.8 |
| POSITIVE (abnormal) | 6,839 | 77.9 |
| No Report of Findings | 293 | 3.3 |

Positive Findings

| | No. | % |
|--------------------|-------|-------|
| Total Conditions** | 6,958 | 100.0 |
| Refractive Error | 4,777 | 68.6 |
| Muscle Imbalance | 953 | 13.7 |
| Amblyopia | 1,034 | 14.9 |
| Other | 194 | 2.8 |
| Not Specified | 1,137 | xxx |
| % of Positive | xxx | 16.6 |

III. RESULTS FOR PROJECTS WITH 50% OR MORE
OF REFERRALS EXAMINEDNo. of projects 774No. Screened, ages 3-6 245,276No. Referred, ages 3-6 11,164% of Screened 4.6No. Examined 8,001% of Referrals 71.7Number Positive 6,209% of Screened 2.5

Findings of Eye Examinations

| | No. | % |
|-----------------------|-------|-------|
| Total Examined | 8,001 | 100.0 |
| Negative (normal) | 1,518 | 19.0 |
| POSITIVE (abnormal) | 6,209 | 77.6 |
| No Report of Findings | 274 | 3.4 |

Positive Findings

| | No. | % |
|--------------------|-------|-------|
| Total Conditions** | 6,371 | 100.0 |
| Refractive Error | 4,379 | 68.7 |
| Muscle Imbalance | 874 | 13.8 |
| Amblyopia | 945 | 14.8 |
| Other | 173 | 2.7 |
| Not Specified | 1,051 | xxx |
| % of Positive | xxx | 16.9 |

*Complete reports are those with no referrals and those with follow-up information on referrals.

**If greater than total for "Positive", some children had more than one condition.

National Society for the Prevention of Blindness, Inc.

April 1972

1970-1971 PRESCHOOL VISION SCREENING PROGRAM
NSPB PROJECTS (22 States)

CRS - 24

| State | No. of Projects | | Complete Projects - Ages 3-6 | | | | | | | | Projects with 50% or more examined - Ages 3-6 | | | | | | | |
|-----------------|-----------------|--------|------------------------------|----------|----------|---------------|----------|--------------|------------|---------------|---|----------|--------------|----------|---------------|------------|--------------|-----|
| | Total | Comp.* | 50% or more Exam. | Screened | Referred | | Examined | | Positive** | | Screened | Referred | | Examined | | Positive** | | |
| | | | | | No. | % of Sc'd. | No. | % of Ref. | No. | % of Sc'd. | | No. | % of Ref. | No. | % of Sc'd. | No. | % of Ref. | No. |
| No. California | 44 | 41 | 32 | 9,596 | 406 | 4.2 | 280 | 69.0 | 230 | 2.4 | 7,856 | 328 | 4.2 | 257 | 78.4 | 207 | 2.6 | |
| So. California | 20 | 18 | 10 | 8,849 | 367 | 4.1 | 188 | 51.2 | 156 | 1.8 | 4,947 | 219 | 4.4 | 135 | 61.6 | 107 | 2.2 | |
| Colorado | 12 | 12 | 11 | 8,812 | 230 | 2.6 | 131 | 57.0 | 113 | 1.3 | 7,375 | 166 | 2.3 | 103 | 62.0 | 87 | 1.2 | |
| Connecticut | 103 | 78 | 70 | 11,718 | 549 | 4.7 | 369 | 67.2 | 283 | 2.4 | 10,477 | 459 | 4.4 | 336 | 73.2 | 262 | 2.5 | |
| Florida | 34 | 31 | 20 | 17,138 | 872 | 5.1 | 519 | 59.5 | 378 | 2.2 | 11,944 | 629 | 5.3 | 437 | 69.5 | 316 | 2.6 | |
| Georgia | 23 | 13 | 8 | 4,462 | 147 | 3.3 | 55 | 37.4 | 45 | 1.0 | 2,480 | 60 | 2.4 | 40 | 66.7 | 33 | 1.3 | |
| Indiana | 13 | 13 | 10 | 10,851 | 264 | 2.4 | 93 | 35.2 | 81 | 0.7 | 2,487 | 72 | 2.9 | 58 | 80.6 | 50 | 2.0 | |
| Iowa | 87 | 73 | 66 | 11,753 | 425 | 3.6 | 337 | 79.3 | 243 | 2.1 | 10,958 | 396 | 3.3 | 327 | 82.6 | 236 | 2.0 | |
| Kentucky | 11 | 11 | 10 | 9,433 | 853 | 9.0 | 512 | 60.0 | 355 | 3.8 | 8,896 | 833 | 9.4 | 504 | 60.5 | 347 | 3.9 | |
| Massachusetts | 59 | 40 | 39 | 8,438 | 303 | 3.6 | 253 | 83.5 | 207 | 2.5 | 8,145 | 295 | 3.6 | 250 | 84.7 | 204 | 2.5 | |
| Minnesota | 91 | 74 | 43 | 12,273 | 762 | 6.2 | 387 | 50.8 | 317 | 2.6 | 7,231 | 392 | 5.4 | 258 | 65.8 | 216 | 3.0 | |
| Mississippi | 116 | 101 | 90 | 11,915 | 563 | 4.7 | 370 | 65.7 | 267 | 2.2 | 9,442 | 387 | 4.1 | 324 | 83.7 | 233 | 2.5 | |
| Nebraska | 9 | 9 | 7 | 3,227 | 133 | 4.1 | 100 | 75.7 | 91 | 2.8 | 2,656 | 99 | 3.7 | 86 | 86.9 | 78 | 2.9 | |
| North Carolina | 10 | 8 | 8 | 4,913 | 153 | 3.1 | 114 | 74.5 | 95 | 1.9 | 4,913 | 153 | 3.1 | 114 | 74.5 | 95 | 1.9 | |
| Ohio | 43 | 39 | 37 | 31,827 | 1,073 | 3.4 | 821 | 76.5 | 663 | 2.1 | 31,661 | 1,060 | 3.3 | 816 | 77.0 | 659 | 2.1 | |
| Oklahoma | 18 | 13 | 9 | 3,416 | 118 | 3.5 | 54 | 45.8 | 44 | 1.3 | 2,227 | 58 | 2.6 | 41 | 70.7 | 31 | 1.4 | |
| Rhode Island | 27 | 23 | 22 | 3,698 | 163 | 4.4 | 132 | 81.0 | 100 | 2.7 | 3,594 | 160 | 4.5 | 131 | 81.9 | 99 | 2.8 | |
| Texas | 43 | 38 | 28 | 21,704 | 1,053 | 4.9 | 591 | 56.1 | 494 | 2.3 | 18,313 | 767 | 4.2 | 500 | 65.2 | 424 | 2.3 | |
| Utah (SLC only) | 2 | 2 | 2 | 4,414 | 68 | 1.5 | 51 | 75.0 | 44 | 1.0 | 4,414 | 68 | 1.5 | 51 | 75.0 | 44 | 1.0 | |
| Virginia | 8 | 7 | 5 | 5,056 | 288 | 5.7 | 204 | 70.8 | 161 | 3.2 | 4,745 | 256 | 5.4 | 191 | 74.6 | 154 | 3.2 | |
| Washington | 45 | 41 | 36 | 15,798 | 685 | 4.3 | 424 | 61.9 | 332 | 2.1 | 13,195 | 521 | 4.0 | 347 | 66.6 | 267 | 2.0 | |
| Wisconsin | 47 | 41 | 38 | 8,951 | 413 | 4.2 | 247 | 59.8 | 186 | 2.1 | 7,413 | 280 | 3.8 | 225 | 80.4 | 171 | 2.3 | |
| Total | 865 | 726 | 601 | 228,242 | 9,888 | 4.3 | 6,232 | 63.0 | 4,885 | 2.1 | 185,369 | 7,658 | 4.1 | 5,531 | 72.2 | 4,320 | 2.3 | |

TOTAL, ALL PROJECTS, ALL AGES: Screened - 265,335 Referred - 12,103 % Referred - 4.6

*Complete reports are those with no referrals and those with follow-up information on referrals.

**Number of children who were examined and found to have positive (abnormal) conditions.

1970-1971 PRESCHOOL VISION SCREENING PROGRAM
INDEPENDENT PROJECTS (11 States)

CRS - 25

| State | No. of Projects | | | Complete Projects - Ages 3-6 | | | | | | Projects with 50% or more examined - Ages 3-6 | | | |
|---|-----------------|--------|-------------------|------------------------------|----------|----------|------------|----------|----------|---|------------|-------|------------|
| | Total | Comp.* | 50% or more Exam. | Screened | Referred | Examined | Positive** | Screened | Referred | Examined | Positive** | No. | % of Sc'd. |
| Delaware | 1 | 1 | 0 | 1,799 | 67 | 3.7 | 16 | 23.9 | 14 | 0.8 | - | - | - |
| Washington, D.C. | 1 | 1 | 1 | 10,129 | 683 | 6.7 | 452 | 66.2 | 364 | 3.6 | 10,129 | 683 | 6.7 |
| Idaho | 1 | 1 | 1 | 2,010 | 42 | 2.1 | 35 | 83.3 | 34 | 1.7 | 2,010 | 42 | 2.1 |
| Missouri | 1 | 1 | 1 | 2,754 | 67 | 2.4 | 37 | 55.2 | 27 | 1.0 | 2,754 | 67 | 2.4 |
| Montana | 1 | 1 | 0 | 2,683 | 52 | 1.9 | 2 | 3.8 | 2 | 0.1 | - | - | - |
| Nevada | 3 | 1 | 1 | 37 | 4 | 10.8 | 3 | 75.0 | 1 | 2.7 | 37 | 4 | 10.8 |
| New Jersey | 122 | 115 | 113 | 16,541 | 1,010 | 6.1 | 814 | 80.6 | 681 | 4.1 | 16,471 | 1,004 | 6.1 |
| New Mexico | 6 | 4 | 3 | 2,677 | 93 | 3.5 | 13 | 14.0 | 12 | 0.4 | 366 | 14 | 3.8 |
| New York | 24 | 16 | 15 | 26,144 | 1,618 | 6.2 | 1,041 | 64.3 | 705 | 2.7 | 25,244 | 1,566 | 6.2 |
| Pennsylvania | 15 | 13 | 7 | 4,885 | 233 | 4.8 | 109 | 46.8 | 92 | 1.9 | 1,891 | 86 | 4.5 |
| South Carolina | 1 | 1 | 1 | 1,005 | 40 | 4.0 | 27 | 67.5 | 22 | 2.2 | 1,005 | 40 | 4.0 |
| Total | 176 | 155 | 143 | 70,664 | 3,909 | 5.5 | 2,549 | 65.2 | 1,954 | 2.8 | 59,907 | 3,506 | 5.9 |
| TOTAL, ALL PROJECTS, ALL AGES: Screened - 87,310 Referred - 4,897 % Referred- 5.6 | | | | | | | | | | | | | |

*Complete reports are those with no referrals and those with follow-up information on referrals.

**Number of children who were examined and found to have positive (abnormal) conditions.

TOTAL: NSPB & INDEPENDENT PROJECTS

PRESCHOOL VISION SCREENING PROGRAM - COMPARATIVE FIGURES

| I. ALL PROJECTS | | <u>1969-1970*</u> | | <u>1970-1971</u> | |
|---|--|-------------------|------------|------------------|------------|
| Number Reporting | | 955 | | 1,041 | |
| Number of Volunteers | | 23,805 | | 27,129 | |
| | | <u>All ages</u> | <u>3-6</u> | <u>All ages</u> | <u>3-6</u> |
| Number Screened | | 351,148 | 308,855 | 352,645 | 331,640 |
| Number Referred | | 19,864 | 14,531 | 17,000 | 15,310 |
| % Referred | | 5.7 | 4.7 | 4.8 | 4.6 |
| II. <u>PROJECTS WITH COMPLETE REPORTS**</u> | | <u>1969-1970</u> | | <u>1970-1971</u> | |
| Number of Projects | | 820 | | 881 | |
| Number Screened, Ages 3-6 | | 277,148 | | 298,906 | |
| Number Referred, Ages 3-6 | | 12,961 | | 13,797 | |
| % Referred | | 4.7 | | 4.6 | |
| Number Examined | | 8,614 | | 8,781 | |
| % of Referrals Examined | | 66.5 | | 63.6 | |
| Number of Positive Findings | | 6,625 | | 6,839 | |
| % of Examined | | 78.1 | | 77.9 | |
| % of Screened | | 2.4 | | 2.3 | |
| III. <u>PROJECTS WITH 50% OR MORE OF THE REFERRALS EXAMINED</u> | | <u>1969-1970*</u> | | <u>1970-1971</u> | |
| Number of Projects | | 705 | | 744 | |
| Number Screened, Ages 3-6 | | 226,226 | | 245,276 | |
| Number Referred, Ages 3-6 | | 10,362 | | 11,164 | |
| % Referred | | 4.6 | | 4.6 | |
| Number Examined | | 7,609 | | 8,001 | |
| % of Referrals Examined | | 73.4 | | 71.7 | |
| Number of Positive Findings | | 5,920 | | 6,209 | |
| % of Examined | | 77.8 | | 77.6 | |
| % of Screened | | 2.6 | | 2.5 | |

*As reported on 1969-1970 state summary of preschool vision screening.

**Complete reports are those with no referrals and those with follow-up information on referrals.

Appendix C: TOTAL HEADSTART PROGRAM

1970-1971 PRESCHOOL VISION SCREENING PROGRAM SUMMARY

I. SCREENING RESULTS, ALL PROJECTSTotal No. of Projects 191Volunteers: No. 1,511 Hours 8,263Reports: Complete* 155 Incomplete 36Hours per volunteer 5.5

| | Total All Ages | Total 3-6 | Sex | | Age | | | |
|---------------|-------------------|--------------|--------|--------|-------|-------|--------|-------|
| | | | Boys | Girls | 3 | 4 | 5 | 6 |
| Screened | | | | | | | | |
| No. | 24,456 | 24,113 | 12,300 | 11,813 | 1,149 | 9,953 | 11,333 | 1,678 |
| Percent | XX | 100.0 | 51.0 | 49.0 | 4.8 | 41.3 | 47.0 | 6.9 |
| Referred | | | | | | | | |
| No. | 1,347 | 1,316 | 639 | 674 | 47 | 585 | 582 | 99 |
| Percent | XX | 100.0 | 48.6 | 51.2 | 3.6 | 44.5 | 44.2 | 7.5 |
| % of Screened | 5.5 | 5.5 | 5.2 | 5.7 | 4.1 | 5.9 | 5.1 | 5.9 |

Breakdown by age and/or sex does not equal total due to incomplete reporting.

RESULTS FOR PROJECTS WITH COMPLETE*
REPORTSNo. of projects 155No. Screened, ages 3-6 21,441No. Referred, ages 3-6 1,157% of Screened 5.4No. Examined 785% of Referrals 67.8Number Positive 632% of Screened 2.9

Findings of Eye Examinations

| | No. | % |
|-----------------------|-----|-------|
| Total Examined | 785 | 100.0 |
| Negative (normal) | 122 | 15.5 |
| POSITIVE (abnormal) | 632 | 80.5 |
| No Report of Findings | 31 | 4.0 |

Positive Findings

| | No. | % |
|--------------------|-----|-------|
| Total Conditions** | 679 | 100.0 |
| Refractive Error | 453 | 66.7 |
| Muscle Imbalance | 128 | 18.9 |
| Amblyopia | 74 | 10.9 |
| Other | 24 | 3.5 |
| Not Specified | 117 | xxx |
| % of Positive | xxx | 18.5 |

III. RESULTS FOR PROJECTS WITH 50% OR MORE
OF REFERRALS EXAMINEDNo. of projects 140No. Screened, ages 3-6 16,039No. Referred, ages 3-6 852% of Screened 5.3No. Examined 685% of Referrals 80.4Number Positive 547% of Screened 3.4

Findings of Eye Examinations

| | No. | % |
|-----------------------|-----|-------|
| Total Examined | 685 | 100.0 |
| Negative (normal) | 112 | 16.3 |
| POSITIVE (abnormal) | 547 | 79.9 |
| No Report of Findings | 26 | 3.8 |

Positive Findings

| | No. | % |
|--------------------|-----|-------|
| Total Conditions** | 590 | 100.0 |
| Refractive Error | 395 | 66.9 |
| Muscle Imbalance | 112 | 19.0 |
| Amblyopia | 62 | 10.5 |
| Other | 21 | 3.6 |
| Not Specified | 101 | xxx |
| % of Positive | xxx | 18.5 |

*Complete reports are those with no referrals and those with follow-up information on referrals.

**If greater than total for "Positive", some children had more than one condition.

1970-1971 PRESCHOOL VISION SCREENING PROGRAM
TOTAL HEADSTART PROGRAM

CRS - 28

| State | No. of Projects | | Complete Projects - Ages 3-6 | | | | | | Projects with 50% or more examined - Ages 3-6 | | | |
|--|-----------------|--------|------------------------------|----------|----------|-----|---------------|----------|---|------------------|------------|-----------|
| | Total | Comp.* | 50% or more Exam. | Screened | Referred | No. | % of Sc'd. | Examined | No. | % of Ref. | Positive** | Positive* |
| NSPB PROJECTS | | | | | | | | | | | | |
| No. California | 8 | 7 | 5 | 910 | 45 | 25 | 4.9 | 55.6 | 23 | 2.5 | 667 | 18 |
| Colorado | 1 | 1 | 0 | 1,437 | 64 | 28 | 4.5 | 43.8 | 26 | 1.8 | - | - |
| Connecticut | 3 | 1 | 1 | 111 | 8 | 4 | 7.2 | 50.0 | 2 | 1.8 | 111 | 2 |
| Florida | 4 | 4 | 3 | 1,457 | 54 | 38 | 3.7 | 70.4 | 28 | 1.9 | 1,115 | 26 |
| Georgia | 2 | 1 | 1 | 70 | 0 | - | - | - | - | - | 70 | - |
| Indiana | 1 | 1 | 1 | 30 | 5 | 5 | 16.7 | 100.0 | 5 | 16.7 | 30 | 5 |
| Iowa | 12 | 6 | 6 | 335 | 21 | 17 | 6.3 | 81.0 | 12 | 3.6 | 335 | 12 |
| Kentucky | 4 | 4 | 4 | 1,368 | 148 | 116 | 10.8 | 78.4 | 86 | 6.3 | 1,368 | 86 |
| Mississippi | 101 | 87 | 82 | 8,624 | 408 | 291 | 4.7 | 71.3 | 213 | 2.5 | 7,728 | 196 |
| North Carolina | 1 | 1 | 1 | 51 | 1 | 1 | 2.0 | 100.0 | 1 | 2.0 | 51 | 1 |
| Ohio | 2 | 2 | 2 | 714 | 40 | 40 | 5.6 | 100.0 | 40 | 5.6 | 714 | 40 |
| Oklahoma | 1 | 1 | 1 | 53 | 2 | 2 | 3.8 | 100.0 | 1 | 1.9 | 53 | 1 |
| Rhode Island | 5 | 4 | 4 | 449 | 29 | 25 | 6.5 | 86.2 | 21 | 4.7 | 449 | 21 |
| Texas | 10 | 7 | 4 | 835 | 46 | 29 | 5.5 | 63.0 | 25 | 3.0 | 606 | 19 |
| Utah (SLC only) | 1 | 1 | 1 | 760 | 15 | 8 | 2.0 | 53.3 | 8 | 1.2 | 760 | 8 |
| Washington | 14 | 12 | 11 | 880 | 61 | 39 | 6.9 | 63.9 | 34 | 3.9 | 473 | 20 |
| Wisconsin | 3 | 2 | 2 | 203 | 12 | 9 | 5.9 | 75.0 | 6 | 3.0 | 203 | 6 |
| INDEPENDENT | | | | | | | | | | | | |
| Delaware | 1 | 1 | 0 | 1,799 | 67 | 16 | 3.7 | 23.9 | 14 | 0.8 | - | - |
| Nevada | 1 | 0 | 0 | - | - | - | - | - | - | - | - | - |
| New Jersey | 12 | 10 | 9 | 1,214 | 124 | 85 | 10.2 | 68.5 | 80 | 6.6 | 1,165 | 79 |
| New Mexico | 4 | 2 | 2 | 141 | 7 | 7 | 5.0 | 100.0 | 7 | 5.0 | 141 | 7 |
| Total | 191 | 155 | 140 | 21,441 | 1,157 | 785 | 5.4 | 67.8 | 632 | 2.9 | 16,039 | 547 |
| TOTAL, ALL PROJECTS, ALL AGES: Screened - 24,456 | | | | | | | | | | % Referred - 5.5 | | |
| *Complete reports are those with no referrals and those with follow-up information on referrals. | | | | | | | | | | | | |
| **Number of children who were examined and found to have positive (abnormal) conditions. | | | | | | | | | | | | |

TOTAL HEADSTART PROGRAM

PRESCHOOL VISION SCREENING PROGRAM - COMPARATIVE FIGURES

| I. ALL PROJECTS | <u>1969-1970*</u> | | <u>1970-1971</u> | |
|---|-------------------|--------|------------------|--------|
| | All ages | 3-6 | All ages | 3-6 |
| Number Reporting | 166 | | 191 | |
| Number of Volunteers | 2,549 | | 1,511 | |
| Number Screened | 30,588 | 30,249 | 24,456 | 24,113 |
| Number Referred | 2,729 | 1,803 | 1,347 | 1,316 |
| % Referred | 8.9 | 6.0 | 5.5 | 5.5 |
| <hr/> | | | | |
| II. <u>PROJECTS WITH COMPLETE REPORTS**</u> | <u>1969-1970</u> | | <u>1970-1971</u> | |
| | | | | |
| Number of Projects | 140 | | 155 | |
| Number Screened, Ages 3-6 | 26,104 | | 21,441 | |
| Number Referred, Ages 3-6 | 1,464 | | 1,157 | |
| % Referred | 5.6 | | 5.4 | |
| Number Examined | 934 | | 785 | |
| % of Referrals Examined | 63.8 | | 67.8 | |
| Number of Positive Findings | 729 | | 632 | |
| % of Examined | 78.1 | | 80.5 | |
| % of Screened | 2.8 | | 2.9 | |
| <hr/> | | | | |
| III. <u>PROJECTS WITH 50% OR MORE OF THE REFERRALS EXAMINED</u> | <u>1969-1970*</u> | | <u>1970-1971</u> | |
| | | | | |
| Number of Projects | 120 | | 140 | |
| Number Screened, Ages 3-6 | 20,690 | | 16,039 | |
| Number Referred, Ages 3-6 | 1,048 | | 852 | |
| % Referred | 5.1 | | 5.3 | |
| Number Examined | 793 | | 685 | |
| % of Referrals Examined | 75.7 | | 80.4 | |
| Number of Positive Findings | 615 | | 547 | |
| % of Examined | 77.6 | | 79.9 | |
| % of Screened | 3.0 | | 3.4 | |

*As reported on 1969-1970 state summary of preschool vision screening.

**Complete reports are those with no referrals and those with follow-up information on referrals.

Appendix D: State School Vision Screening Programs, Summary of Report 32/

Summary

The results of a survey of state school vision screening programs are reported. Questionnaires were completed by all states, the District of Columbia, New York City, Puerto Rico, and three of the territories surveyed.

A detailed summary and analysis of the characteristics of the screening programs based on reports from 23 states are presented.

As a result of this survey some general observations and recommendations for program improvement can be made.

1. Current vision screening programs do not reach all school-age children in this country. In at least 26 states, less than 100 percent of the school districts are covered by the existing programs.

If an adequate eye health program is to be provided to all students, vision screening should be statewide and cover all school districts. In addition there should be a comparable program in each private and parochial school.

2. The goal of each program should be an annual vision screening for each student in all grades. The various screening patterns indicate that while screening may be an annual event, only certain grades are screened each year.

Since some children with abnormal conditions may escape detection on several screenings, an annual screening is important. This is particularly so for the elementary grades where previously undetected conditions are most frequently picked up. An annual screening not only discovers children who may have eye problems previously unknown but also screens out those who have had some eye care but may need to be reexamined.

3. The shortage of personnel to do the screening was noted as a problem. In 60 percent of the 28 states, nurses or teachers are responsible for vision screening. The National Society has found in its preschool vision screening program that trained volunteers can ably administer vision tests with a high degree of efficiency. To relieve the personnel shortage, serious consideration should be given to the use of well-trained volunteers for both the initial screening and the rescreening of students. Teachers and nurses would then be freed from this task so that they can concentrate on the important duties of follow-up on referrals and interpretation of the program and results to parents.

4. Adequate information is not available on the completeness of follow-up on students who are referred for a complete professional eye examination. Undoubtedly, this is an area where most programs can be improved. The nurse or teacher should be responsible for this phase of the program.

Each student should be followed to assure that he has received an examination and whatever care may be indicated.

For students who are already under care, nurses and/or teachers should see that periodic examinations, as recommended by the professional examiner, are secured.

5. Uniform and adequate standards for screening procedures should be set at the state level in consultation with professional eye specialists. To insure reasonable conformity with the standards, administration of the statewide program should be the responsibility of one or both of the state agencies concerned--Health and Education.

The National Society's Advisory Committee on Vision Screening is reviewing its recommendations concerning screening tests and procedures, grades to be screened, and criteria for referral. These will be made available in a Society publication in the near future.

6. Improved reporting of local program results to the state agency responsible for overall supervision of the program is needed. It is evident that in

some states the local schools either are not required to, or do not, report program results to the state agency. Adequate statistical reporting of program results from each school, school district, or local health department would provide the state agency with a basis for evaluating the effectiveness of the program and for assisting with its improvement where indicated.

The state agency should provide standard record and reporting forms so that comparable data will be collected from each local agency. For evaluation, information is needed on the number of students screened, referred, examined, and found to have abnormal eye conditions, as well as on the number already under care.

Most of the states are very much aware of which phases of their screening program need strengthening and are presently working toward making whatever changes or improvements are necessary. We are hopeful that with time the ultimate goal of providing each student with the best possible health care program, of which vision screening is a vital part, will be attained.

Appendix E: VISIC Demand Search Bibliography

The following bibliography was compiled from data from the Visual Science Information Center (VISIC) of the University of California, Berkeley, California. Their data base begins with publications released in November, 1970, but some citations previous to that data can appear in the listing. This search was made on citations concerning refractive error incidence in children and the incidence of eye disorders, other than refractive errors, in children. Terms are included which will identify the age group discussed.

VISUAL SCIENCE INFORMATION CENTER, TELEPHONE 415-642-4647

06/15/73

51195 Serial

Shearer, C. Wayne Chattanooga, Tennessee

A comparative study between two types of refractive errors and their relationship to reading retardation (continued from September issue)

Southern Journal of Optometry, 12 (10): 7-8, 35-36, Oct. 1970

CHILD (6-12 YEARS)/2; COMPARATIVE STUDY/2; FAMILY HISTORY/2; HUMAN/2; HYPERMETROPIA/1; INCIDENCE/2; INTELLIGENCE TESTS/2; MYOPIA/1; POPULATION STUDY/2; READING/2; READING DISORDERS/1; STATISTICAL STUDY/2; VISUAL ACUITY TESTS/2;

64483 Serial

Prakash, Prem Dr. Rajendra Prasad Centre for Ophthalmic Sciences AIIMS, New Delhi

Agarwal, Lalit P. Dr. Rajendra Prasad Centre for Ophthalmic Sciences AIIMS, New Delhi

Gupta, S.B. Dr. Rajendra Prasad Centre for Ophthalmic Sciences AIIMS, New Delhi

Refractive errors in children

Journal of Pediatric Ophthalmology, 8(1): 42-57, Feb, 1971

ADOLESCENT (13-18 YEARS)/2; AGE FACTORS/2; ANISOMETROPIA/2; ASTIGMATISM, HYPERMETROPIC/2; ASTIGMATISM, MYOPIC/2; CHILD (6-12 YEARS)/2; CHILD, PRESCHOOL (2-5 YEARS)/2; FEMALE/2; HUMAN/2; HYPERMETROPIA/2; INCIDENCE/2; INDIA/2; INFANT (1-23 MONTHS)/2; MALE/2; MYOPIA/2; REFRACTIVE ERRORS/1; SEX FACTORS/2; STATISTICAL STUDY/2;

68381 Serial

Maruo, Toshio University of Tokyo

Kubota, Nobue University of Tokyo

(The ocular disturbances of cerebral palsy. 111. Refraction of cerebral palsy-ocular disturbances and rehabilitation of physically and mentally handicapped.)

Acta Societatis Ophthalmologicae Japonicae, 75(1): 898-902, 1971

Japanese English Abstract

CEREBRAL PALSY/1; CHILD (6-12 YEARS)/2; CHILD, PRESCHOOL (2-5 YEARS)/2; HUMAN/2; HYPERMETROPIA/1; INCIDENCE/2; MYOPIA/1; OCULAR MANIFESTATIONS/2; STATISTICAL STUDY/2;

79588 Serial

Courtney, G.R. Central State Hospital, Milledgeville, Ga.

Refractive errors in institutionalized mentally retarded and emotionally disturbed children.

American Journal of Optometry, 48(6): 402-497, June, 1971

ADOLESCENT (13-18 YEARS)/2; CHILD (6-12 YEARS)/2; HOSPITALS, MENTAL/2; HUMAN/2; HYPERMETROPIA/1; INCIDENCE/2; INTELLIGENCE TESTS/2; MENTAL DISORDERS AND BEHAVIORAL SYMPTOMS/1; REFRACTIVE ERRORS/1; STATISTICAL STUDY/2; VISION SCREENING/2;

81787 Serial

Yonechi, Kazuo Tohoku University, Sendai

(Epidemiological study on myopia prevalence rate of school children)
Japanese Journal of Clinical Ophthalmology, 25(3): 413-425,
Mar. 1971

Japanese English Abstract

AGE FACTORS/2; CHILD (6-12 YEARS)/2; ENVIRONMENT/2; HUMAN/2;
INCIDENCE/2; MYOPIA/1; POPULATION STUDY/2; SEX FACTORS/2;
STATISTICAL STUDY/2;

91774 Serial

Asabina, V.A.

(Health condition and previous diseases in children with accommodation
spasm in case of false and true myopia.)
Oftal'mologicheskii Zhurnal, 26(4): 289-294, 1971

Russian English Abstract

CHILD(6-12 YEARS)/2; CHILD, PRESCHOOL (2-5 YEARS)/2;
CILIARY MUSCLE SPASM/2; DISEASES AND OTHER DISORDERS/1;
HUMAN/2; INCIDENCE/2; MYOPIA, AXIAL/2; PSEUDOMYOPIA/1;
STATISTICAL STUDY/2;

95311 Serial

Woodruff, M. Emerson University of Waterloo

Cross sectional studies of corneal and astigmatic characteristics
of children between the twenty-fourth and seventy-second months
of life.

American Journal of Optometry, 48(8): 650-659, Aug. 1971

AGE FACTORS/2; ASTIGMATISM, CORNEAL/1; CHILD (6-12 YEARS)/2;
CHILD, PRESCHOOL (2-5 YEARS)/2; MATHEMATICAL ANALYSIS/2;
POPULATION STUDY/2; RETINOSCOPY/2; SEX FACTORS/2;
STATISTICAL STUDY/2;

99520 Serial

Maimulov, V.G.

(The state of visual functions in Leningrad Children of underschool
age.)

Oftal'mologicheskii Zhurnal, 26(5): 378-381, 1971

Russian English Abstract

AGE FACTORS/2; AMBLYOPIA/1; BINOCULAR VISION DISORDERS/1;
CHILD (6-12 YEARS)/2; ETIOLOGY/2; HUMAN/2; INCIDENCE/2;
LENINGRAD/2; POPULATION STUDY/2; REFRACTIVE ERRORS/1;
STATISTICAL STUDY/2; STRABISMUS/1; VISION SCREENING/2;
VISUAL ACUITY, DECREASED/1;

131091 Serial

Drasdo, N.

The ophthalmic coorelates of reading disability

Ophthalmic Optician, 11(21): 948, 953-955, Oct. 30, 1971

ANISOMETROPIA/2; ASTIGMATISM/2; CHILD (6-12 YEARS)/2; COLOR
VISION DISORDERS/2; DYSLEXIA/2; HUMAN/2; INCIDENCE/2;
READING DISORDERS/1; REFRACTIVE ERRORS/1; SPECTACLE LENSES
WEAR/2; STATISTICAL STUDY/2; STRABISMUS/2; VISUAL ACUITY/2;

145831 Serial

McMullen, William V. Tempe, Arizona

The refractive state in Hopi children

Optometric Weekly, 63(2): 28-29, Jan. 13, 1972

ADOLESCENT (13-18 YEARS)/2; ASTIGMATISM/2; CHILD (6-12 YEARS)/1;
CHILD, PRESCHOOL (2-5 YEARS)/2; HUMAN/2; HYPERMETROPIA/2;
INCIDENCE/2; INDIANS, NORTH AMERICAN/1; MYOPIA/2; POPULATION
STUDY/2; REFRACTION, OCULAR/2; REFRACTIVE ERRORS/1;
STATISTICAL STUDY/2; VISION SCREENING/2;

166332 Serial

Kostal, J. Očni oddeleni OUNZ Pardubice

Prohlidky deti predskolního věku (Examination of
pre-school aged children.)

Ceskoslovenska Oftalmologie, 28(1): 46-54, Jan. 1972

Czech English Abstract

AMBLYOPIA/1; ANISOMETROPIA/2; ASTIGMATISM/2; CHILD (6-12
YEARS)/2; ESOTROPIA/2; EXOTROPIA/2; REFRACTION,
OCULAR/2; REFRACTIVE ERRORS/1; STATISTICAL STUDY/2;
STRABISMUS/1; VISION SCREENING/1;

16844- Serial

Utkin, V.F.

(Visual acuity and refraction in children with tuberculous
intoxication.)

Oftal'mologicheskii Zhurnal, 27(1): 34-36, 1972

Russian English Abstract

ADOLESCENT (13-18 YEARS)/2; ASTIGMATISM, MYOPIC/2; CHILD
(6-12 YEARS)/2; HUMAN/2; INCIDENCE/2; MYOPIA/1; OCULAR
MANIFESTATIONS/2; REFRACTIVE ERRORS/1; STATISTICAL
STUDY/2; TUBERCULOSIS/1; VISUAL ACUITY, DECREASED/2;

171760 Serial

Rudobielski, Romuald Z Oddziału Okulistycznego Wojew.

Szpitala w Białymstoku

Dziuba, Jadwiga Z Poradni Okulistycznej Wojew. Praychodni
Specjalistycznej

Profilaktyczne badania narządu wzroku uczniów szkół
podstawowych w województwie Białostockim w latach
1957-1960 (Prophylactic examinations of the visual
organ in primary schools of the Bialystok district
in the years 1957-1970)

Klinika Oczna, 42(1a): 399-403, 1972

Polish English Abstract

ASTIGMATISM/2; CHILD (6-12 YEARS)/2; HUMAN/2;
HYPERMETROPIA/2; INCIDENCE/2; MYOPIA/2; POLAND/2;
REFRACTIVE ERRORS/1; STATISTICAL STUDY/2; VISION
SCREENING/1;

171778 Serial

Koraszevska-Matuszewska, Bronislawa Z Obozu
 Spoleczno-Wychowawczego Studentow AM w Katowicach. Z
 Kliniki Okulistycznej AM w Katowicach
 111g. Wladyslaw Z Obozu Spoleczno-Wychowawczego Studentow
 AM w Katowicach. Z Kliniki Okulistycznej AM w Katowicach
 Wartosc masowych badan okulistycznych dzieci szkolnych
 (The value of ophthalmological mass examinations in
 school children)
 Klinika Oczna, 42 (1a): 395-398, 1972
 Polish English Abstract
 ADOLESCENT (13-18 YEARS)/2; CHILD (6-12 YEARS)/2;
 ETIOLOGY/2; EYE DISORDERS/1; HUMAN/2; INCIDENCE/2;
 POLAND/2; REFRACTIVE ERRORS/1; STATISTICAL STUDY/2;
 STRABISMUS/1; VISION SCREENING/1; VISUAL ACUITY,
 DECREASED/2;

194107 Serial

Lukaszewicz, Benon Z Oddzialu Okulistycznego Szpitala
 Miejskiego w Swidnicy
 Badania refrakcji do 3 roku zycia (Examination of
 refraction up to the 3rd year of life)
 Klinika Oczna, 42(3): 833-835, 1972
 Polish English Abstract
 CHILD, PRESCHOOL (2-5 YEARS)/1; HUMAN/2; HYPERMETROPIA/2;
 INCIDENCE/2; INFANT (1-23 MONTHS)/1; INFANT, NEWBORN (TO 1
 MONTH)/1; MYOPIA/2; REFRACTIVE ERRORS/1; SEX FACTORS/2;
 STATISTICAL STUDY/2;

52701 Serial

Pilganchuk, V.V.
 (Eye traumatism in children of agricultural districts)
 Oftal'mologicheskii Zhurnal, 4:455-456, 1970
 Russian
 CHILD(6-12 YEARS)/1; CHILD, PRESCHOOL (2-5 YEARS)/1;
 EYEBALL INJURY/1; HUMAN/2; INCIDENCE/2; INJURY,
 OCULAR/2; STATISTICAL STUDY/2; USSR/2;

68314 Serial

Ishikawa, Satoshi University of Tokyo School of Medicine
 Inaba, Koji University of Tokyo School of Medicine
 Naito, Makoto University of Tokyo School of Medicine
 Ohto, Ken University of Tokyo School of Medicine
 (Eye disease induced by organic phosphorous
 insecticides)
 Acta Societatis Ophthalmologicae Japonicae, 75(1): 841-855,
 1971
 Japanese English Abstract
 CHILD(6-12 YEARS)/2; CHOLINESTERASE/2; EYE DISORDERS/1;
 HUMAN/2; INSECTICIDES/1; JAPAN/2; POISONING/1;
 POPULATION STUDY/2; STATISTICAL STUDY/2; VISUAL
 FIELD DEFECT/2;

123382 Serial

Jensen, Robert D. National Cancer Institute, Bethesda, Md.
Miller, Robert W.

Retinoblastoma: epidemiologic characteristics

New England Journal of Medicine, 285(6): 307-311, Aug. 5, 1971

ABNORMALITIES, MULTIPLE/2; ADOLESCENT (13-18 YEARS)/2; AGE
FACTORS/2; CENTRAL NERVOUS SYSTEM DISORDERS/2; CHILD
(6-12 YEARS)/2; CHILD PRESCHOOL (2-5 YEARS)/2; EPIDEMIOLOGY/2;
HUMAN/2; INCIDENCE/2; INFANT (1-23 MONTHS)/2; INFANT, NEWBORN
(TO 1 MONTH)/2; MENTAL RETARDATION/2; MORTALITY/2; NEGROES/2;
NEOPLASMS, BY SITE/2; NEOPLASMS, OCULAR/2; RACIAL FACTORS/2;
RETINOBLASTOMA/1; SEX FACTORS/2; STATISTICAL STUDY/2;
THERAPY/2; UNITED STATES/2;

138045 Serial

Alberman, Eva D. National Bureau for Co-operation in Child Care
Butler, Neville R. University of Bristol
Gardiner, Peter A. Guy's Hospital

Children with squints. A handicapped group?

Practitioner, 206(1234): 501-506, Apr. 1971

BRAIN DISORDERS/1; CEREBRAL PALSY/2; CHILD (6-12 YEARS)/1;
HUMAN/2; INCIDENCE/2; MENTAL RETARDATION/2; PSYCHOLOGICAL
FACTORS/2; STATISTICAL STUDY/2; STRABISMUS/1; VISUAL
ACUITY/2;

189464 Serial

Kirkland, Rebecca T. Baylor College of Medicine
Kirkland, John L. Baylor College of Medicine
Roberson, Michael C. Baylor College of Medicine
Librik, Leon Baylor College of Medicine
Clayton, George W. Baylor College of Medicine

Strabismus and congenital hypothyroidism

Journal of Pediatrics, 80(4): 648-649, Apr. 1972

CHILD (6-12 YEARS)/2; CHILD, PRESCHOOL (2-5 YEARS)/2;
HUMAN/2; HYPOTHYROIDISM/1; INCIDENCE/2; NYSTAGMUS/2;
OCULAR MANIFESTATIONS/2; STATISTICAL STUDY/2;
STRABISMUS/1;

195413 Serial

Hatfield, Elizabeth M.

Blindness in infants and young children

Sight-Saving Review, 42(2): 69-89, Summer, 1972

BLINDNESS/1; CHILD, PRESCHOOL (2-5 YEARS)/2; ETIOLOGY/2;
INCIDENCE/2; INFANT (1-23 MONTHS)/2; INFANT, NEWBORN
(TO 1 MONTH)/2; OCULAR MANIFESTATIONS/2; RETROLENTAL
FIBROPLASIA/1; RUBELLA/2; STATISTICAL STUDY/2; UNITED
STATES/2;

